CEL-MAR®
Zakład Informatyki i Elektroniki

# User manual

## ADA-13040
## ETHERNET to RS485/RS422 Converter

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## 1. GENERAL INFORMATION

Thank you for your purchase of **CEL-MAR Company** product. This product has been completely tested and is covered by a two year warranty on parts and operation from date of sale.
If any questions or problems arise during installation or use of this product, please do not hesitate to contact Technical Support at +48 41 362-12-46 or e-mail support@cel-mar.pl.

### 1.1. WARRANTED INFORMATION

**ADA-13040** converter is covered by a two year warranty from date of sale. In case of being damaged it will be repair or the damaged component will be replace. The warranty does not cover damage caused from improper use, materials consumption or any unauthorized changes. If the product does not function (is damaged), or not operate in accordance with the instructions, will be repaired or replaced.
All warranty and no warranty repairs must be returned with paid transport and insuring to the CEL-MAR Company.
**CEL-MAR Company** under no circumstances won't be responsible for ensuing damage from improper using the product or as a result of random causes: the lightning discharge, the flood, the fire and the like.
**CEL-MAR Company** is not be held responsible for damages and loss including: loss of profits, loss of data, pecuniary losses ensuing from using or the impossibility of using this product.
In specific cases **CEL-MAR Company** discontinue all warranties and in particular do not follow the user manual and do not accept terms of warranty by the user.

### 1.2. GENERAL CONDITIONS FOR SAFE USE

The device should be installed in a safe and stable places (eg, electroinstallation cabinet), the powering cable should be arranged so as not to be exposed to trampling, attaching, or pulling out of the circuit.
Do not put device on the wet surface.
Do not connect devices for nondescript powering sources,
Do not damage or crush powering wires.
Do not make connection with wet hands.
Do not adapt, open or make holes in casings of the device!
Do not immerse device in water or no other liquid.
Do not put the fire opened on device sources: candles, an oil lamps and the like.
Complete disable from the supply network is only after disconnecting the power supply circuit voltage.
Do not carry out the assembly or dis-assembly of the device if it is enabled. This may result to short circuit and damage the device.

### 1.3. CE LABEL

CE symbol on organizing the company CEL-MAR a conformity of the device to the directive of the electromagnetic **EMC 2004/108/WE** (Electromagnetic Compatibility Directive). The declaration of the agreement is accessible through the contact with the technical service at the address e-mail: serwis@cel-mar.pl or on the phone at the +48 41 362-12-46.

### 1.4. ENVIRONMENTAL PRESERVATION

This sign on the device inform about putting expended device with other waste materials. Device should send to the recycling. (In accordance with the act about the Electronic Appliance Expended from day 29 of July 2005)

### 1.5. SERVICE AND MAINTENANCE

The ADA-13040 converter does not require the servicing and maintenance.
Technical support is available at number +48 41 362-12-46 in 8.00-16.00, from Monday to Friday or e-mail support@cel-mar.pl.

## 2. PRODUCT INFORMATION

### 2.1. PROPERTIES

- Operating on ETHERNET network- IEEE 802.3 standard,
- 10/100BaseT physical layer,
- Baud rate 10/100Mbps (auto-sensing),
- Full or half duplex (auto-sensing) operates mode,
- Protocols: TCP, UDP, DHCP, SNMP, SSL/TLS, Telnet, Rlogin, LPD, HTTP/HTTPS, SMTP, ICMP, IGMP, ARP,
- WWW sever implemented for converter configuration,
- Configuration of net services according to user personal setting,
- Static or dynamic IP address (added by DHCP verver),
- Diagnostics of serial and network port,
- Encoded transmission: DES (56-bit), 3DES (168-bit), AES (128/256-bit),
- Functioning in modes: virtual serial port, serial bridge TCP, serial bridge UDP, TCP sockets, UDPsockets,
- Functioning on 2 and 4 wire line on RS485 network,
- Functioning on 4 wire line on RS422 network,
- RS485/RS422 baud rates: 50, 75, 110, 134, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400,
- RS485/422 data format - Number of data bits: 5, 6, 7, 8; Parity checking: None, Odd, Even, Constantly 1, Constantly 0; Stop Bits: 1, 2,
- Transparent for all protocols, which the data format is compatible with the above specifications of RS485/422 interface eg MODBUS, DNP, PROFIBUS and others,
- Power supply 10 - 30 VDC stable min. 3W,
- 3kV= optoizolation in signal channel between ETHERNET and v interface,
- 1kV= or 3kV= galvanic isolation between ETHERNET interface and power supply

- 1kV= or 3kV= galvanic isolation between RS485/RS422 interface and power supply,
- Implemented protection against power supply reverse connection,
- Implemented short circuit protection and over-voltage protection on RS485/422 network,
- Connection RS485/422 network and power supply via screw terminal block,
- DIN 43880 standard– mounting in typical electro-installation unit,
- Rail mounting according to DIN35 / TS35 standard,
- Dimensions (W x D x H) 52,8mm x 58mm x 90mm.

### 2.2. DESCRIPTION

ADA-13040 converter is used for data transmission between devices equipped with RS485/RS422interface via LAN/WAN network.
In the ETHERNET network converter can operate in Virtual Serial Port mode, TCP serial bridge mode, UDP serial bridge mode. Converter can use protocols: TCP, UDP, DHCP, SNMP, SSL/TLS, Telnet, Rlogin, LPD, HTTP/HTTPS, SMTP, ICMP, IGMP, ARP. The converter has implemented a web server what allow you to configure and menage it via internet browser. ADA-13040 support the asynchronous transmission data with baud rate 230,4 kbps via RS485/RS422 interface and use RX+,RX-,TX+(A),TX-(B) signals.
It is possible to connect 32 devices operating in half duplex mode to RS485 network constructed on ADA-13040.
The Converter is adapted to supply an external voltage source fron 10V to 30V and power 3W. ADA-13040 has implemented protection against opposite polarization of power supply and over-voltage protection on RS485/RS422 network. Converter has galvanic isolation between ETHERNET and RS485/RS422 interface and power supply and optoisolation in signal channel between ETHERNET and RS485/RS422 interface

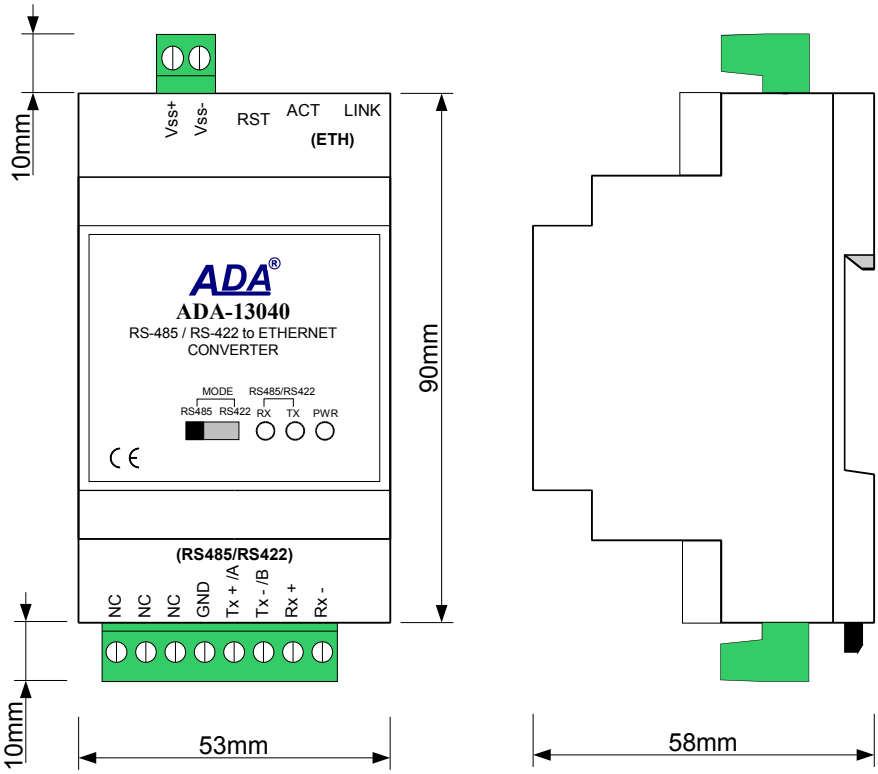


Fig 1. ADA-13040 view

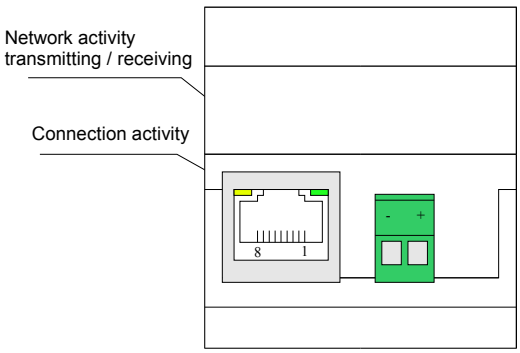


Fig 2. ETHERNET RJ45 connector view

### 2.3. ETHERNET NETWORK COMMUNICATION

#### 2.3.1. TCP/UDP PORTS MODE COMMUNICATION

Communication in TCP/UDP ports mode enable for application (SCADA, MMI etc) data transferring to converter serial port via Ethernet network in use TCP/UDP ports by using the services of client and TCP/UDP server.

#### 2.3.2. VIRTUAL SERIAL PORT (REALPORT) MODE COMMUNICATION

Communication in virtual serial port mode enable for application (SCADA, MMI etc) data transferring to converter serial port via Ethernet network by using the virtual COM port installed in operating system.

#### 2.3.3. SERIAL BRIDGE MODE COMMUNICATION

Communication in serial bridge mode enable to data transferring via Ethernet network between serial ports of converters in point-to-point topology or multi-point topology by using the services of client and TCP/UDP server.

#### 2.3.4. OTHER COMMUNICATION MODES

You can configure the converter for operating in :
- terminal mode,
- modem emulation mode,
- console mode,
- user mode.

RS485/RS422 converter can not operate properly in this mode because it is for complete RS232 interface.

## 3. INSTALLATION

This chapter will show you how correctly connect ADA-13040 to RS485/RS422 network, ETHERNET network and power supply.
To reduce disturbance from environment, it is recommended:
– use suitable diameter cable for power supply on account of voltage drop,
– use the interference eliminators for powering the converters installed in the range of some building,
– not powering the converters form power-circuit of devices generate large impulse disturbance like contactors, relays, inverters.

### 3.1. CONVERTER ASSEMBLING

The converter case is adapted to assembly on TS-35 (DIN35) rail. To install converter you should mount device on the rail upper part of the case then press bottom part to to hearing characteristic „Click" sound.

### 3.2. ETHERNET NETWORK CONNECTION

You should connect ADA-13040 to ETHERNET network via switch, hub or directly to network adapter of PC by cable with RJ45 connector for modular socket – see Fig.2.
Table below show preparing of straight cable for converter connection to switch or hub.

**Table 1.**

| RJ45 Pin No. | Signal | Wire Color EIA/TIA 568B | Straight cable UTP 4x2x0,5 | Wire Color EIA/TIA 568B | Signal | RJ45 Pin No. |
|---|---|---|---|---|---|---|
| 1 | TX+ | White-Orange | | White-Orange | TX+ | 1 |
| 2 | TX- | Orange | | Orange | TX- | 2 |
| 3 | RX+ | White-Green | | White-Green | RX+ | 3 |
| 4 | Not used | Blue | | Blue | Not used | 4 |
| 5 | Not used | White-Blue | | White-Blue | Not used | 5 |
| 6 | RX- | Green | | Green | RX- | 6 |
| 7 | Not used | White-Brown | | White-Brown | Not used | 7 |
| 8 | Not used | Brown | | Brown | Not used | 8 |

Table below show preparing of cross-over cable for connection of converter to PC network adapter or converters together for operating as point-to-point serial bridge.

**Table 2.**

| RJ45 Pin No. | Signal | Wire Color EIA/TIA 568B | Cross-Over Cable UTP 4x2x0,5 | Wire Color EIA/TIA 568B | Signal | RJ45 Pin No. |
|---|---|---|---|---|---|---|
| 1 | TX+ | White-Orange | | White-Green | TX+ | 1 |
| 2 | TX- | Orange | | Green | TX- | 2 |
| 3 | RX+ | White-Green | | White-Orange | RX+ | 3 |
| 4 | Not used | Blue | | Blue | Not used | 4 |
| 5 | Not used | White-Blue | | White-Blue | Not used | 5 |
| 6 | RX- | Green | | Orange | RX- | 6 |
| 7 | Not used | White-Brown | | White-Brown | Not used | 7 |
| 8 | Not used | Brown | | Brown | Not used | 8 |

In modular socket ETHERNET interface of converter are implemented two LED's (Fig. 2):
– Green ACT signaling state of sending or receiving data,
– Orange LINK signaling active network connection.

ADA-13040 converter in the ETHERNET network can function as:
– virtual serial bridge [RealPort],
– TCP serial bridge,
– UDP serial bridge.

Additional information about Ethernet connection will be describe in chapters below.

### 3.2.1. CONNECTION TO NETWORK ADAPTER OF PC

If you have not switch or hub you can connect ADA-13040 directly to a network adapter of PC using the cross-over cable (Table 2). This connection can be used for converter configuration.

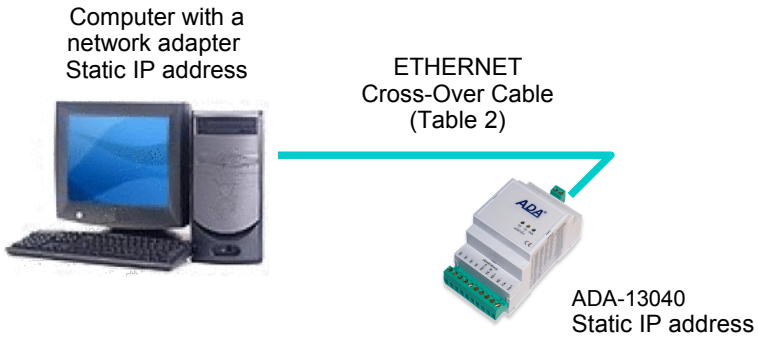


**Fig 3. Direct converter connection to computer network adapter**

### 3.2.2. CONNECTION FOR REALPORT MODE OPERATING

Fig. 3 and 4, 5 below show how correctly connect ADA-13040 to LAN, WAN network or PC to operating in virtual serial port mode (RealPort). You should make directly converter connection to network adapter of PC according to p.3.2.1. If you connect converter to switch or HUB use cable like in Table 1.

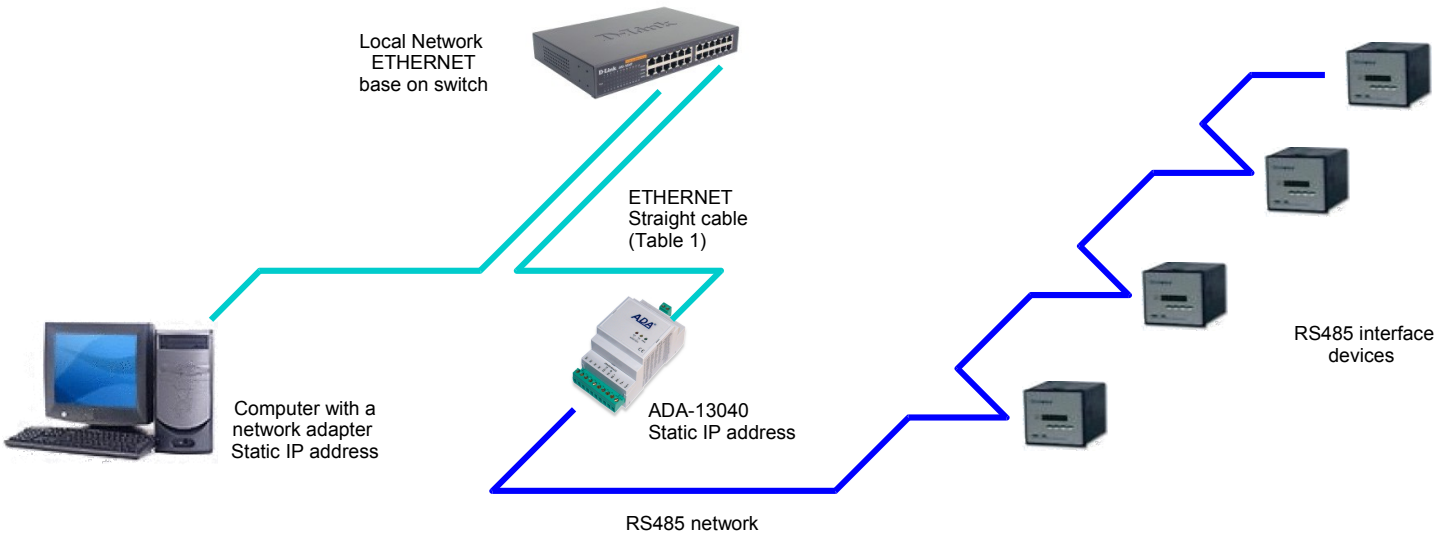


**Fig 4.Connecting for Real Port mode operating via switch or Hub for LAN network**

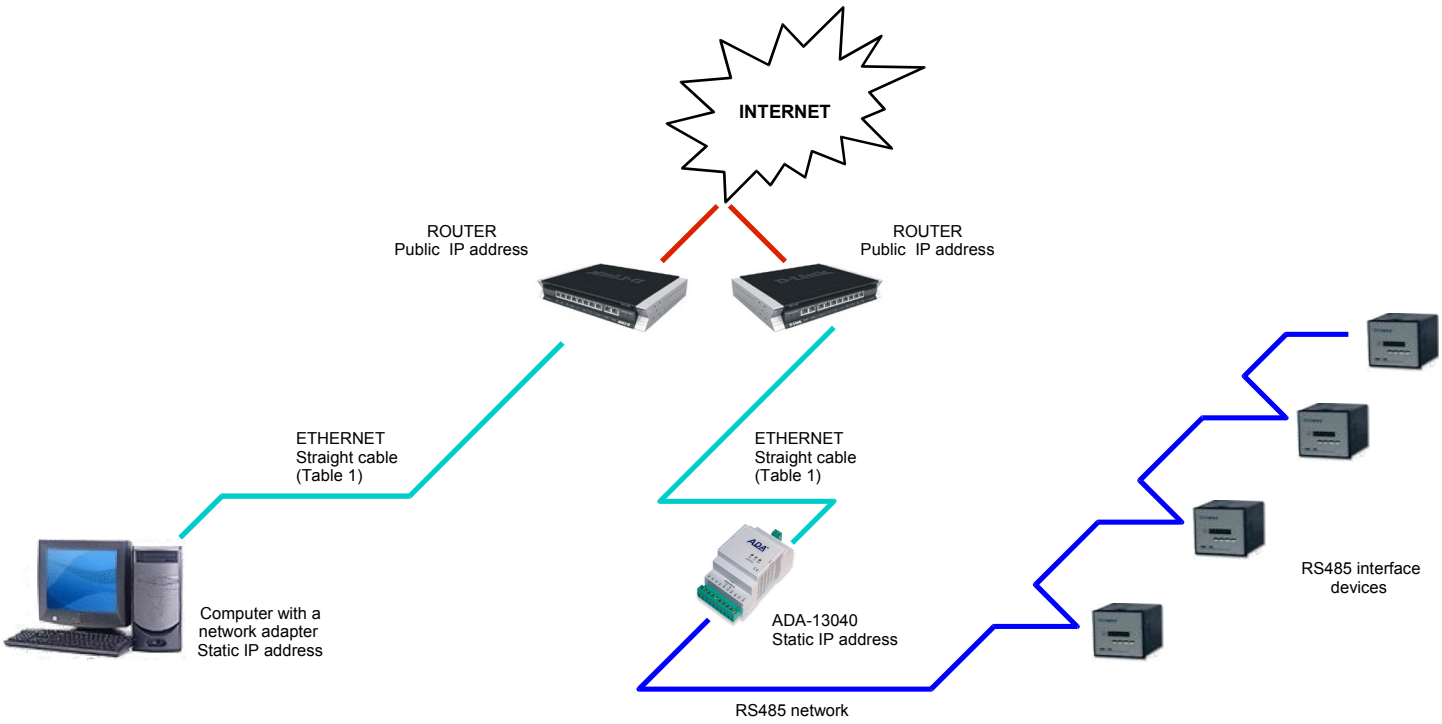


**Fig 5. Connection for operating in Real Port mode for WAN network**

### 3.2.3. CONNECTION FOR FUNCTIONING IN TCP AND UDP SERIAL BRIDGE MODE

Fig. 6 and 7 show how correctly connect ADA-13040 converter to Ethernet network for operating in TCP and UDP serial bridge mode. If you connect converter to switch or hub you should use cable prepared like in Table 1.

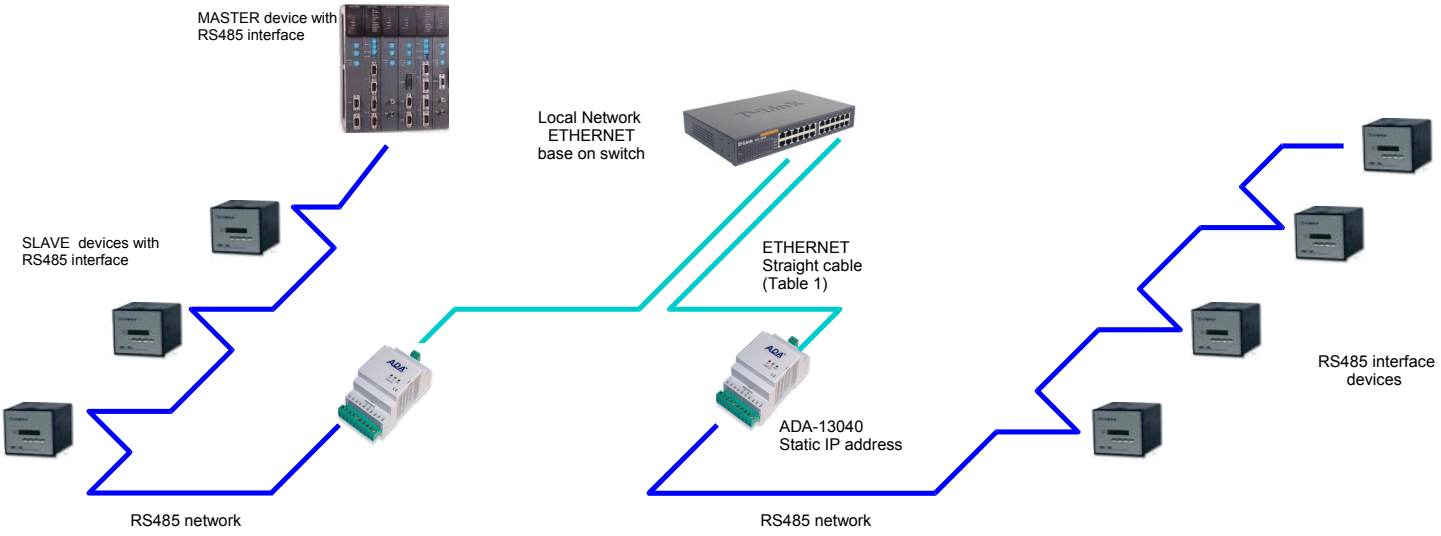


**Fig 6. Connection for operating in TCP/UDP serial bridge, point-to-point in LAN network**

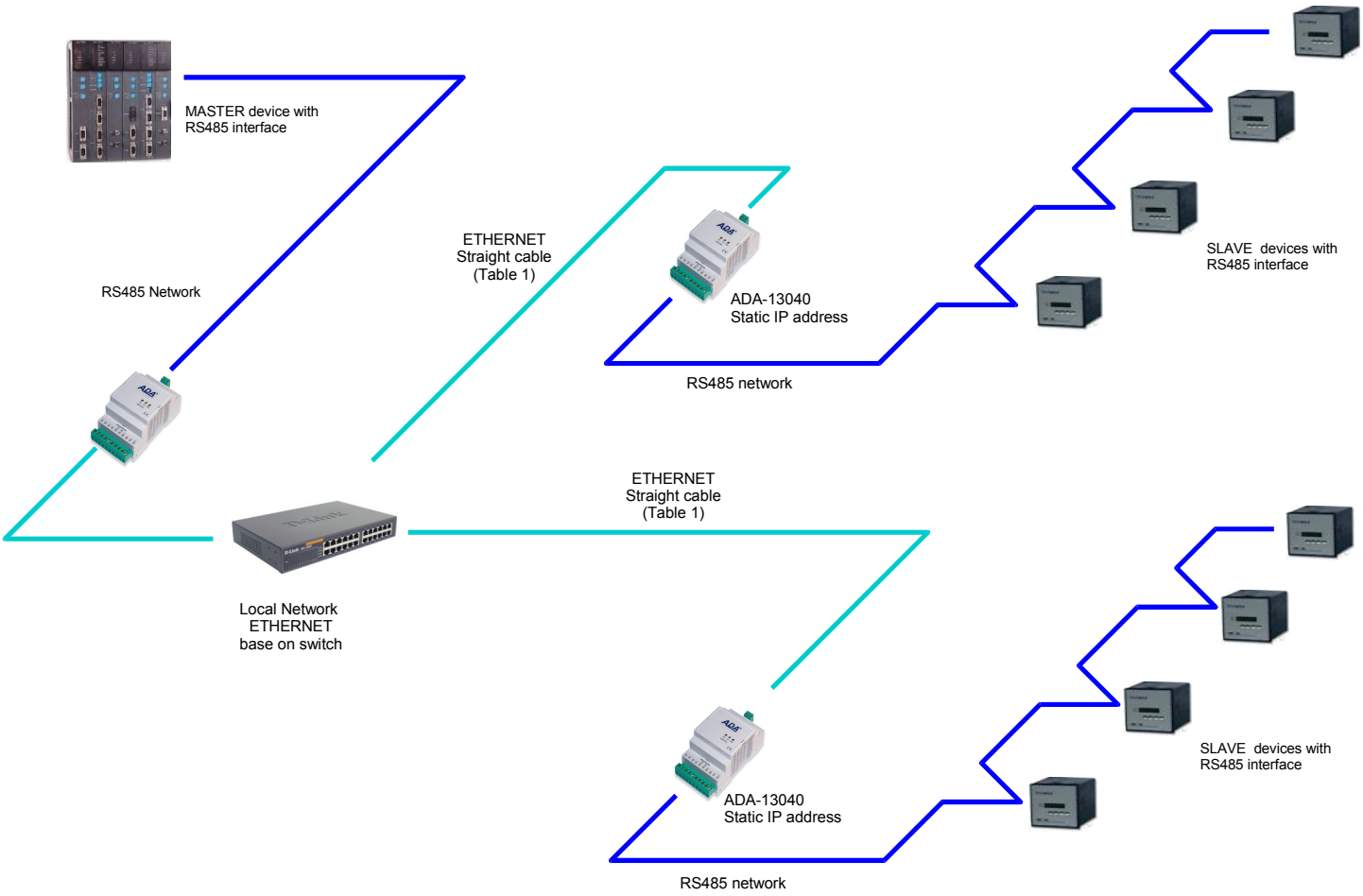


**Fig 7. Connection for operating in UDP serial bridge, point-to-multipoint in LAN network**

### 3.3. CONNECTION TO RS485/RS422 NETWORK

#### 3.3.1. CONNECTION TO 4-WIRE RS422 NETWORK

You should set the MODE switch on front panel to RS422 mode, before connecting the network. Example of connection is shown below

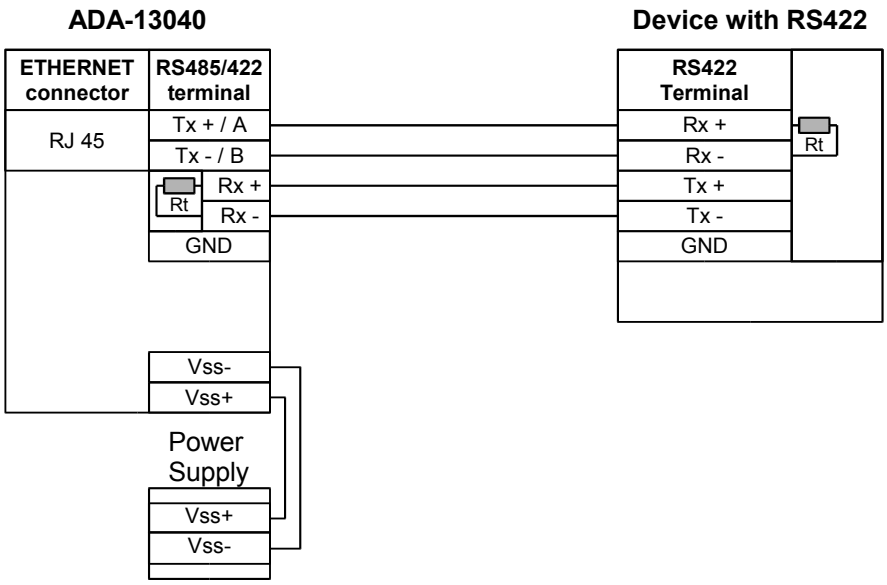


**Fig 8. RS422 device connection to ADA-13040**

### 3.3.2. CONNECTION TO 4-WIRE RS485 NETWORK

You should set the MODE switch on front panel to RS485 mode, before connecting the network. Example of connection is shown below.

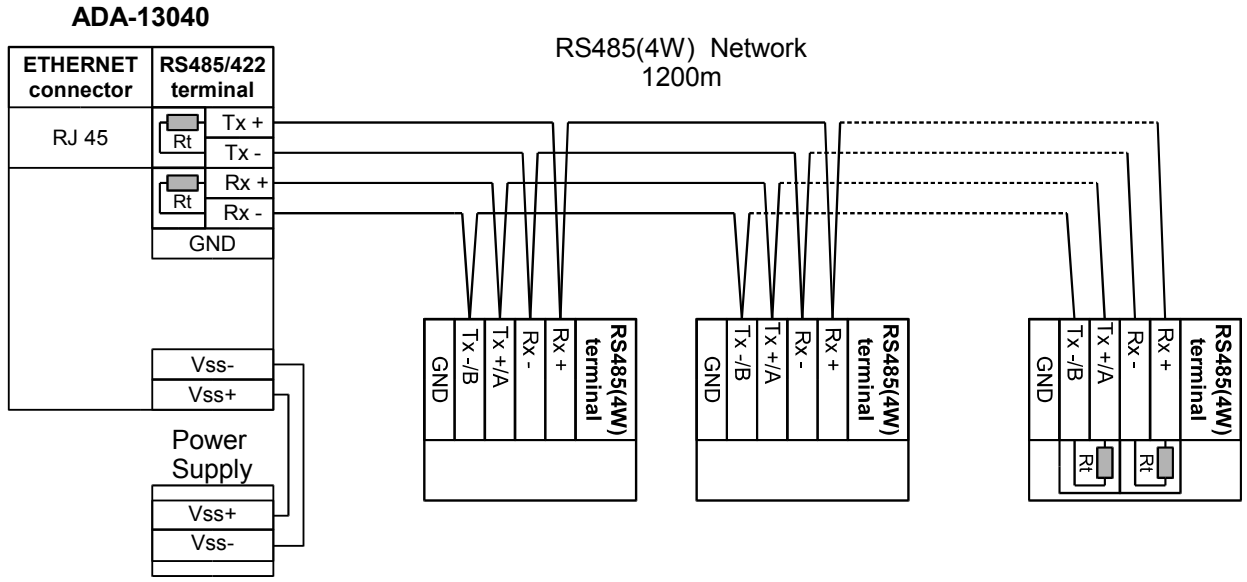


**Fig 9. RS485(4W) device connection to ADA-13040**

### 3.3.3. CONNECTION TO 2-WIRE RS485 NETWORK

You should set the MODE switch on front panel to RS485 mode, before connecting the network. Example of connection is shown below.

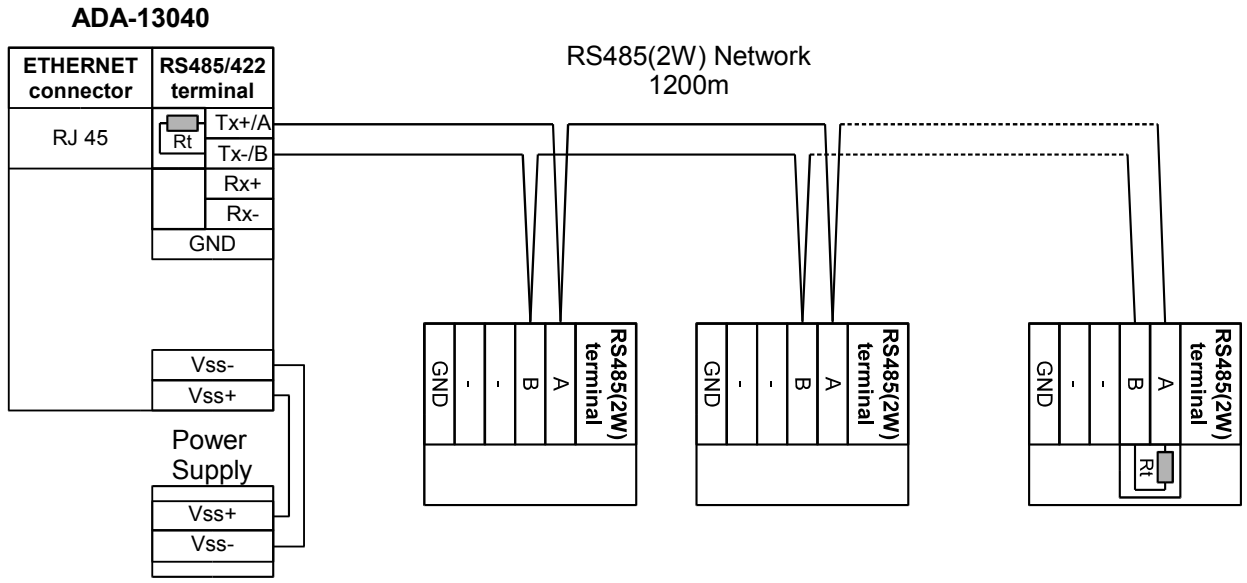


**Fig 10. RS485(2W) device connection to ADA-13040**

### 3.3.4. LINE TERMINATION ON RS485/422 NETWORK

The application of Line Termination (terminator) Rt = 120 W lets reduce result of reflection in length line and on high baud rate. It is not needed below 9600Bd but for distance upper then 1000m and 9600Bd or 700m and 19200Bd you should use the Line Termination if the transmission will be incorrect. Examples connections of Rt are shown on Fig. 8, 9, 10.
ADA-13040 converter has implemented two Line Termination, connected to terminals Tx+/A - Tx-/B and Rx+ - Rx-, activated by SW1 switch as below.

| SW1 | Description |
|---|---|
| 1 | ON – enable the terminator 120 Ω to terminals Tx+/A and Tx-/B<br>OFF – disable the terminator 120 Ω to terminals Tx+/A and Tx-/B |
| 2 | ON – enable the terminator 120 Ω to terminals Rx+ and Rx-<br>OFF – disable the terminator 120 Ω to terminals Rx+ and Rx- |

### 3.4. POWER SUPPLY CONNECTION

You should have DC power supplies (regulated) output voltage from 10 V= to 30V=, min. nominal power 3W, e.g. ZS-12/250. Power cable from DC power supplies to device can not be longer than 3m. You should connect positive (+) end of DC power supplies to Vss+ device terminal and negative (-) end to Vss-.
ADA-13040 converter has the protection from opposite connection power supply. If after connection power supply on converter front panel will not lighting green led PWR, You should check the correctness of power supply connecting.

## 4. ACTIVATION

If connection was made properly green LED PWR on front panel of converter should lit, if not check polarization of connected power. When data is transmitted LEDs on RJ45 connector and RX, TX should blink. This LED are show below:

| *LED* | *Description* |
|---|---|
| | ***RS485/RS422 interface and power supply*** |
| **PWR** | Signalization of Power Supply |
| **RX** | Signalization of data receiving by ADA-13040 from RS485/RS422 port |
| **TX** | Signalization of data transmission from ADA-13040 through RS485/RS422 interface |
| | ***ETHERNET interface*** |
| **Yellow** | Signaling a valid connection to the network |
| **Green** | Signaling data transmission |

## 5. CONFIGURATION

You should configure network services and network setting of ADA-13040 converter. You will find below the stages of software installation and network setting configuration of converter.

### 5.1. RS485 / RS422 OPERATING MODE

Hardware configuration of operating mode RS485 or RS422, you set by use the MODE switch (fig.1) on front panel of converter.

### 5.2. ADAFinder SOFTWARE

#### 5.2.1. INSTALLATION OF ADAFinder SOFTWARE

You can make the preliminary configuration of network setting in converter using ADAFinder or ADAWiz software. The installation is automatically after insert the CD (compact disc) to CD-ROM drive. If the autorun doesn't start You should run the file setup.exe located in ADANet catalog.
After installation the software ADAFinder and ADAWiz You can find in ***Start->Programs->CEL-MAR->ADANet.***

#### 5.2.2. NETWORK SETTING

The ADAFinder software is being used to converter network setting configuration. After running the computer program is searching in local network and if find ADA-13040 will add it to the list of available converter **[Devices list]** Fig.11.
**To change the network setting of ADA-13040 converter you should:**
- mark converter on **[Devices List]** press button **[Configure IP Settings ]**
- in window **[Set IP Address]** select „Automatic network configuration form DHCP server" (default setting) or „Manual network configuration". If you select the Manual network configuration you should type IP address, subnet mask, IP address of default gateway and converter administrator password for authorization of configuration changes.
- press **[Apply]**, the configuration will be saved and converter will reboot. After information „Operation finish properly", You should press **[Refresh List]** in the window of ADAFinder. The list of available converters **[Devices List]** will be updated after new searching.
Other main application window buttons:
- converter selection form list and pressing button **[Reboot Devices]** will cause programmable reboot of converter for updating configuration network setup,
- converter selection form list and pressing button **[Devices Info]** will cause showing the converter information window,
- converter selection form list and pressing button **[Open Internet Page]** will cause running of WWW browser and opening converter configuration page.

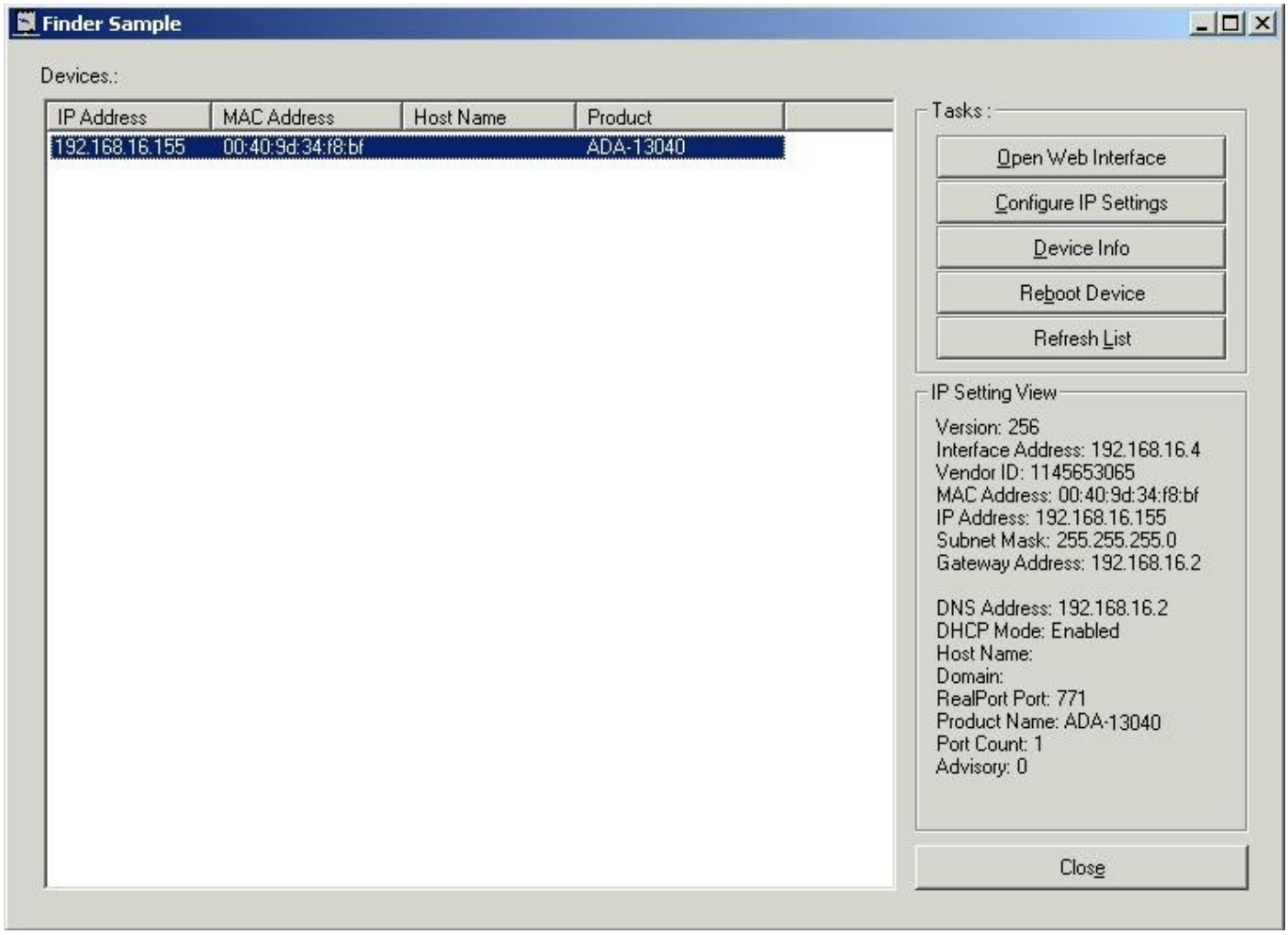


**Fig 11. Basic Network Configuration using ADAFinder**

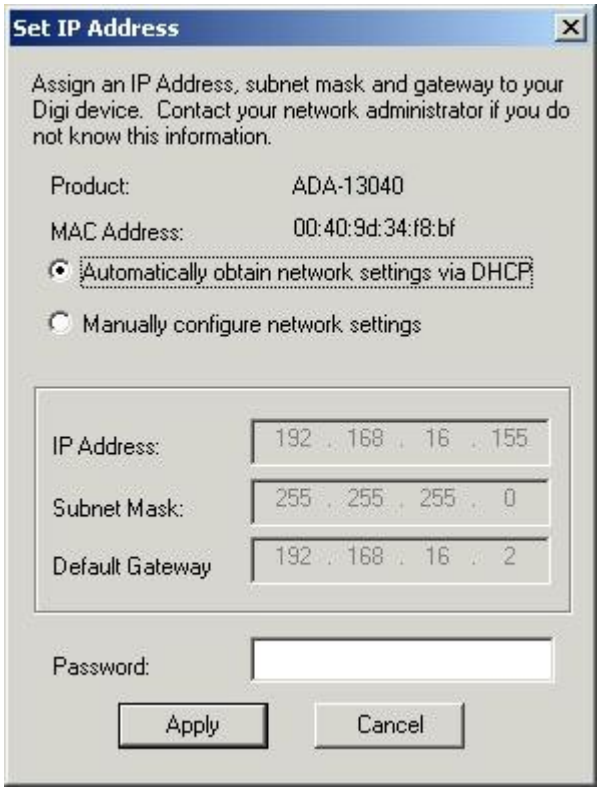
Set IP Address
Assign an IP Address, subnet mask and gateway to your Digi device. Contact your network administrator if you do not know this information.
Product: ADA-13040
MAC Address: 00:40:9d:34:f8:bf
Automatically obtain network settings via DHCP
Manually configure network settings
IP Address: 192 . 168 . 16 . 155
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway 192 . 168 . 16 . 2
Password:
Apply
Cancel

**Fig 12. IP address setting**

### 5.3. CONFIGURATION AND MANAGEMENT WITH USE OF INTERNET BROWSER

WWW server of ADA-13040 converter enable to easy configuration and diagnostics of LAN and WAN network devices with use Internet browser.
To make the configuration of ADA-13040, open the Internet Browser and type the address http://<converter-ip-address>/admin/administration.htm . The login windows will open.
You should enter Username and Password as follow:

Username : root
Password : dbps

If the the Username and the Password are correct will open the page as below.

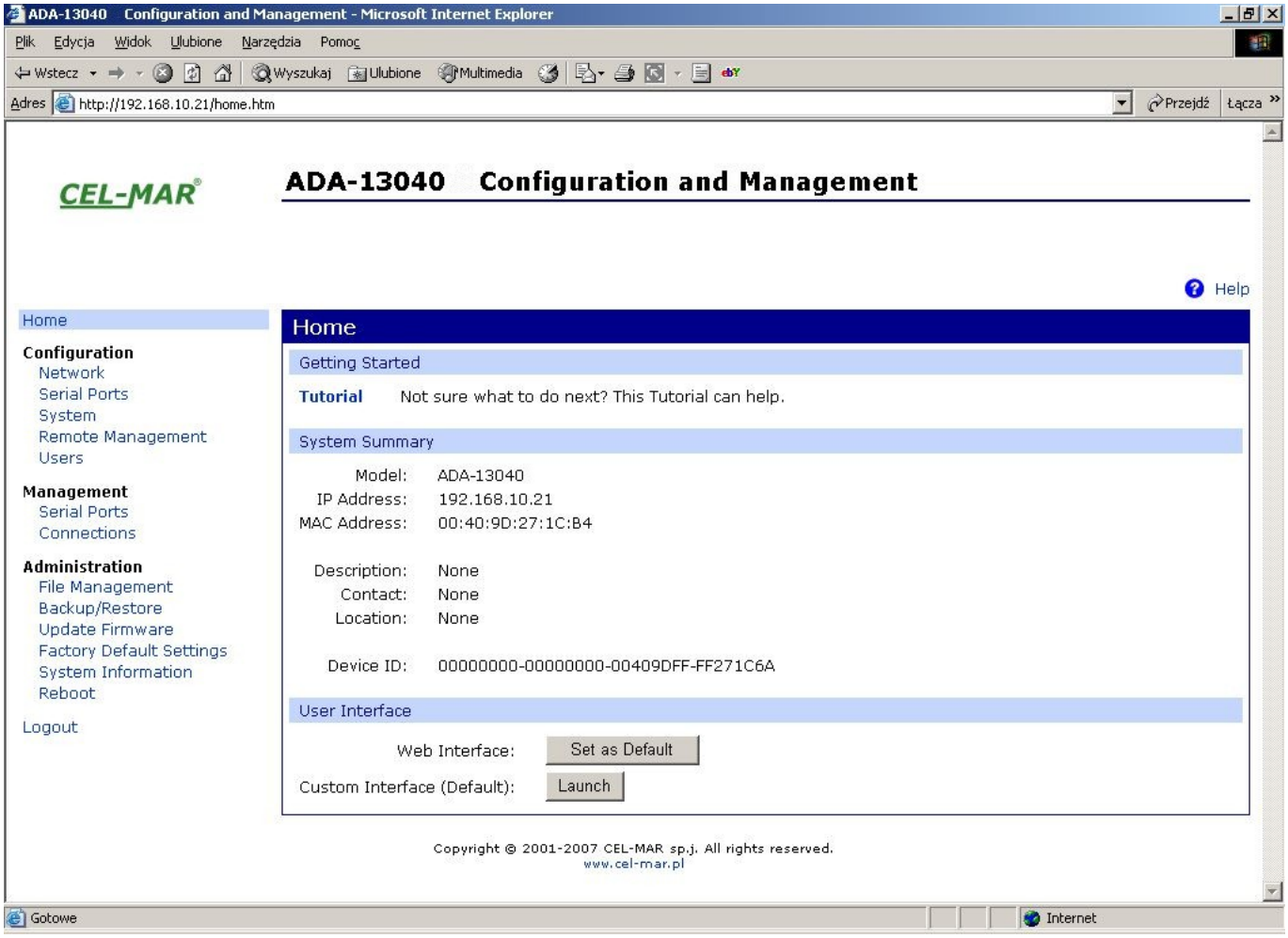


**Fig 13. Page for configuration and management**

#### 5.3.1. NETWORK SETTING

To change network setting of ADA-13040 you should select **Network** from **Configuration** menu, on page **Network** (Fig.14) select [**IP Settings**] and make the choice of:
**„Obtain an IP address automatically using DHCP"** or „**Use the following IP address**" in this case you should type:
converter IP address, subnet mask, IP address default gateway.
Press [**Apply**] and the configuration will be saved. After information „Operation finish properly", you should select menu **Reboot** and press [**Reboot**], converter will be restart and new network setting will be update.

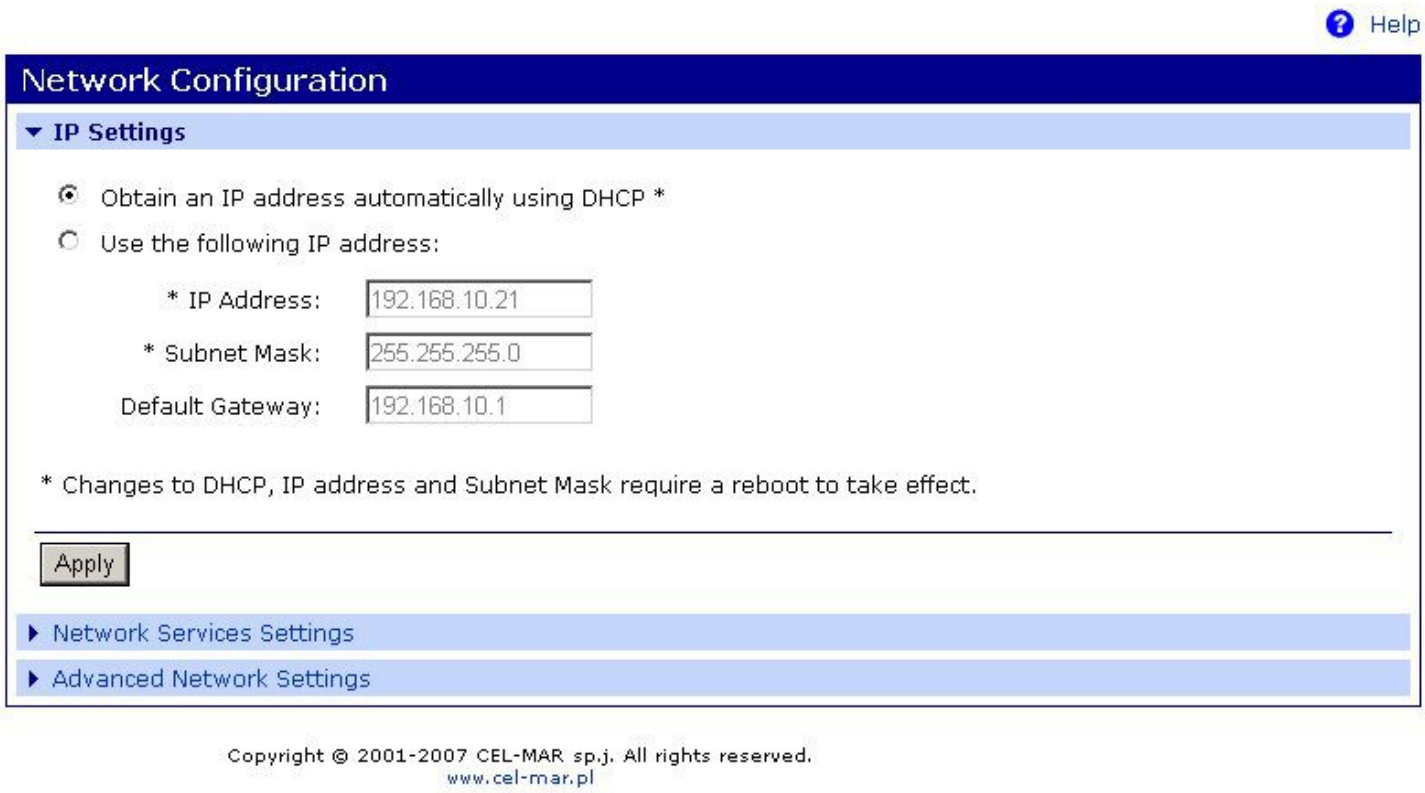


**Fig 14. Network setting**

### 5.3.2. SERIAL PORT SETTTING

Serial port configuration of ADA-13040 include port description, profile port setting (operate mode) and parameter setting of serial transmission (speed, number of data bits, parity bits, stop bits).
To start configuration press **Serial Ports** for menu **Configuration** and on page **Serial Port Configuration** select **Port 1.** Page with details configuration of serial port will open:

- Port Profile Settings
- Basic Serial Settings
- Advanced Serial Settings

#### 5.3.2.1. CONFIGURATION OF SERIAL PORT PROFILE (OPERATING MODE)

Serial port profile you can set on page **Serial Port Configuration => Port Profile Settings** and then **Change Profile...** the page will appear **Select Port Profile** (Fig. 15).
ADA-13040 operates properly in profiles as follow:
- RealPort
- TCP Sockets
- UDP Sockets
- Serial Bridge

All profiles will be described in the further part.

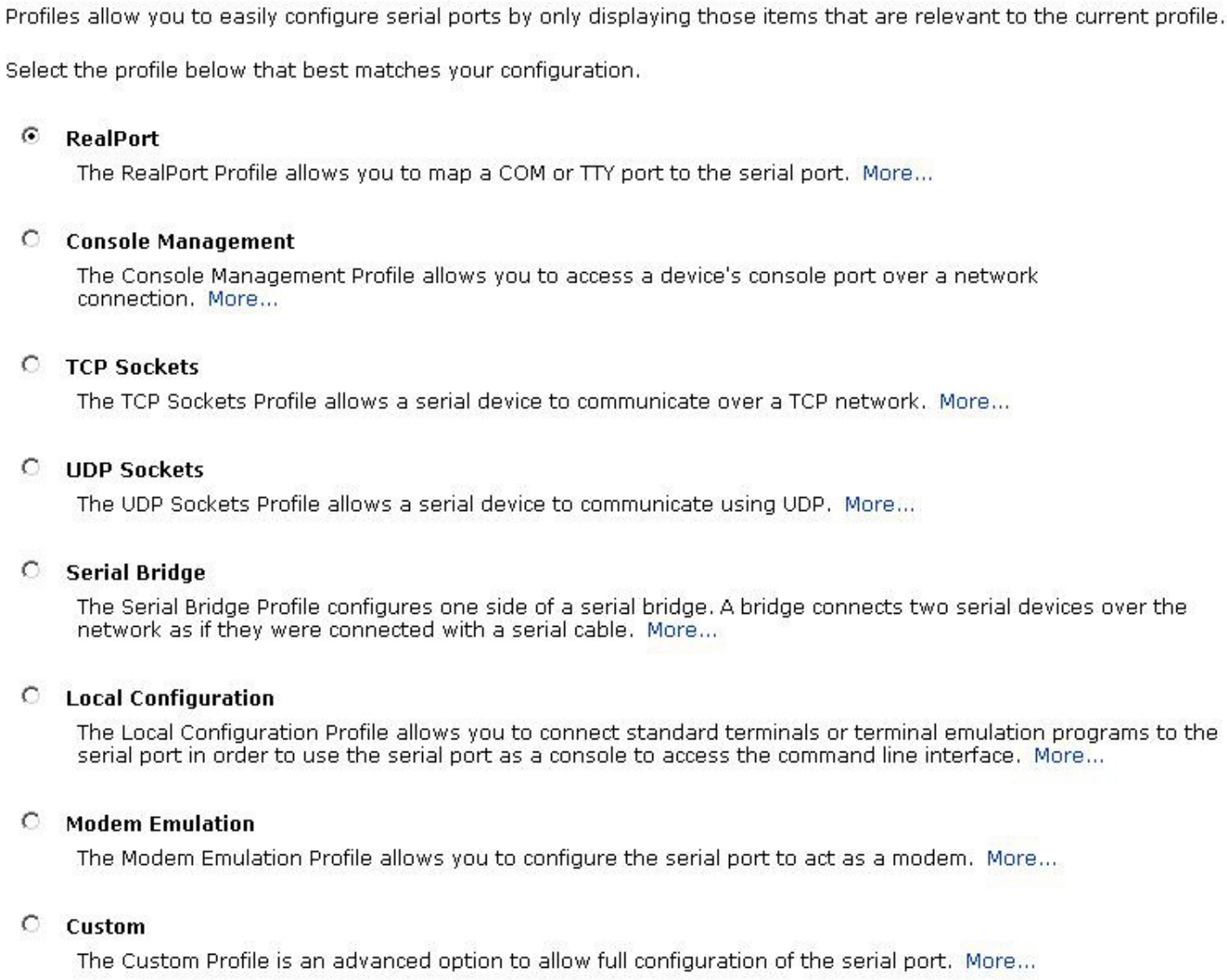
Profiles allow you to easily configure serial ports by only displaying those items that are relevant to the current profile.
Select the profile below that best matches your configuration.
RealPort
The RealPort Profile allows you to map a COM or TTY port to the serial port. More...
Console Management
The Console Management Profile allows you to access a device's console port over a network connection. More...
TCP Sockets
The TCP Sockets Profile allows a serial device to communicate over a TCP network. More...
UDP Sockets
The UDP Sockets Profile allows a serial device to communicate using UDP. More...
Serial Bridge
The Serial Bridge Profile configures one side of a serial bridge. A bridge connects two serial devices over the network as if they were connected with a serial cable. More...
Local Configuration
The Local Configuration Profile allows you to connect standard terminals or terminal emulation programs to the serial port in order to use the serial port as a console to access the command line interface. More...
Modem Emulation
The Modem Emulation Profile allows you to configure the serial port to act as a modem. More...
Custom
The Custom Profile is an advanced option to allow full configuration of the serial port. More...

**Fig 15. Serial port profiles**

#### 5.3.2.1.1. REALPORT PROFILE

Select RealPort profile for configuration of the ADA-13040 serial port for communication with virtual port COM of PC. Press [**Apply**] button for saving the configuration. After installation in operating system the RealPort driver of virtual port COM, transmitted data over application to this port are send via the network to the ADA-13040 and display on his serial port. Installation of RealPort driver is shown in chapter .5.
RealPort service enables to create only one connection via ETHERNET network between PC and converter. The queries from other PC to converter will be ignoring, and will be error communication.

#### 5.3.2.1.2. TCP SOCKETS PROFILE

If you choose TCP Sockets profile you will configure serial port of convert to direct communication with PC with use TCP Sockets. Transmitted data over application to TCP socket are send via the network to the ADA-13040 and display on his serial port. For saving selected configuration press button [**Apply**].

##### 5.3.2.1.2.1. TCP SERVER AND CLIENT

After saving the port configuration in section **TCP Server Settings** you can select **Enable TCP Keep Alive** what it means the connection will be keep even if data won't be sending via the network.

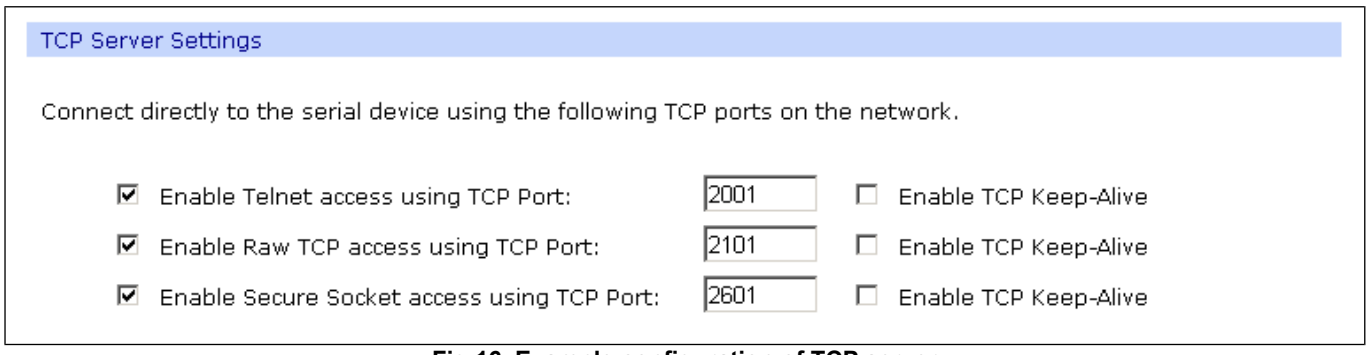
TCP Server Settings
Connect directly to the serial device using the following TCP ports on the network.
Enable Telnet access using TCP Port:
2001
Enable TCP Keep-Alive
Enable Raw TCP access using TCP Port:
2101
Enable TCP Keep-Alive
Enable Secure Socket access using TCP Port:
2601
Enable TCP Keep-Alive

**Fig 16. Example configuration of TCP server**

For configuration of **TCP Client Settings**, select **Automatically establish TCP connections,** it means connection between client and TCP sever will be set automatically.
Next select option **Always connect and maintain connection** and in the part **Establish connection to the following network service** enter device IP address to which TCP client will send the data, service and port.
You can also select **Enable TCP Keep Alive** what it means the connection will be keep even if data won't be sending via the network.
For saving the configuration of TCP server and TCP client press button [**Apply**].

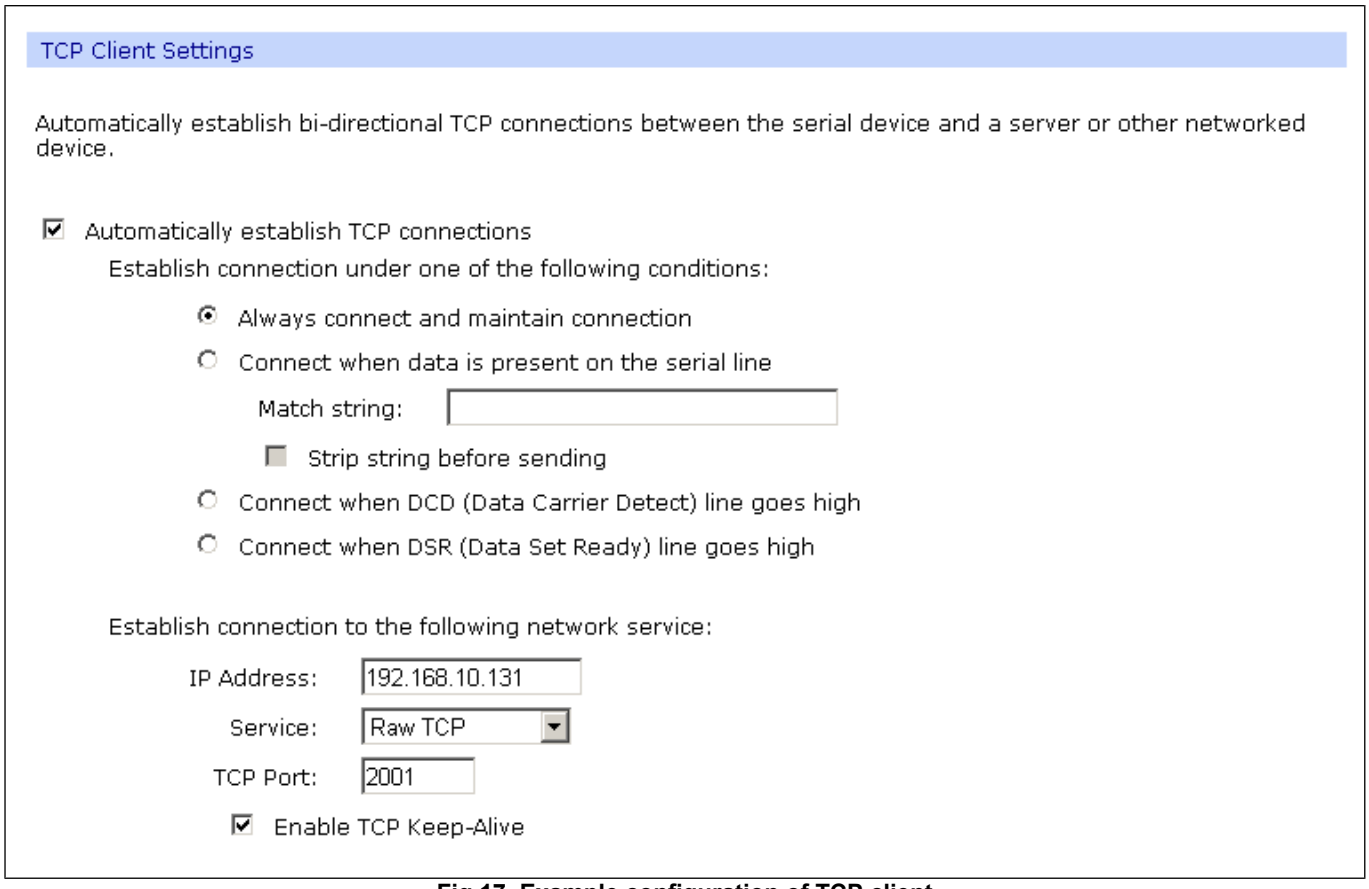
TCP Client Settings
Automatically establish bi-directional TCP connections between the serial device and a server or other networked device.
Automatically establish TCP connections
Establish connection under one of the following conditions:
Always connect and maintain connection
Connect when data is present on the serial line
Match string:
Strip string before sending
Connect when DCD (Data Carrier Detect) line goes high
Connect when DSR (Data Set Ready) line goes high
Establish connection to the following network service:
IP Address:
192.168.10.131
Service:
Raw TCP
TCP Port:
2001
Enable TCP Keep-Alive

**Fig 17. Example configuration of TCP client**

**ATTENTION !**
**2101 is default port of serial port service .**
**If conflict will come in the local network with the other network service using the same port in the configuration of the converter you have to change the number of the port to other for the server of the serial bridge service and the client.**

#### 5.3.2.1.2.2. THE 'ENABLE TCP KEEP-ALIVE' OPTION CONFIGURATION

Option **Enable TCP Keep-Alive** keeps connection between server and client, even if the data is not transmitted over the network and reconnection in case of interruption.
Configuration of this option can be made by selection **Configuration > Network > Advanced Network Settings > TCP Keep-Alive** Settings. In this section can be configured:
–**Idle Time** – specifies the period of time (scope 10 sec. - 24 hours) that a TCP connection has to be idle before a keep-alive is sent.
–**Probe Interval** – the time in seconds between each keep-alive probe (scope 10 – 75 sec.),
–**Probe Count** – the number of times TCP probes the connection to determine (scope 5 – 30 trials).

#### 5.3.2.1.2.3. SERIAL PORT TRANSMISSION PARAMETERS

Converter will properly operate with devices connected to one serial port RS485/RS422 if the transmission parameters are the same. Select **Basic Serial Settings** and enter Baud Rate, Data Bits, Parity, Stop Bits – the same like in device connected to serial port of converter.

#### 5.3.2.1.3. UDP SOCKETS PROFILE

If you select UDP Sockets profile you will configure serial port of ADA-13040 to direct communication with PC or other device connected to network with use UDP Sockets. Transmitted data over application to UDP socket are send via the network to the ADA-13040 and display on his serial port. For saving selected configuration press button [**Apply**].

#### 5.3.2.1.3.1. UDP CLIENT & SERVER CONFIGURATION IN CASE OF MASTER DEVICE

After saving the UDP Sockets profile, will open section **UDP Server Settings** with operating parameters like on picture below. Set an access to UDP server on e.g. 2101 port. Then select Automatically send serial data in section **UDP Client Settings**, this automatically send received data by the use UDP client service to the SLAVE device connected to LAN/WAN through e.g. ADA-13020, ADA-13028L, ADA-13040MG, ADA-13110, ADA14040, ADA-14040.
On lists **Send data to the following network services** are addresses of network devices and ports to which will be send data. In field:
–**Description** - enter e.g. location of the converter and SLAVE device,
–**Send To** - enter IP address of e.g. converter, connected to SLAVE device,
–**UDP Port**- enter the number of port on which is working UDP Server of converter connected to SLAVE device and press [**Add**]
In the section **Send data under any of the following conditions** is recommended to set parameters like on picture bellow.
For saving the configuration of UDP client and server for MASTER device, press [**Apply**].

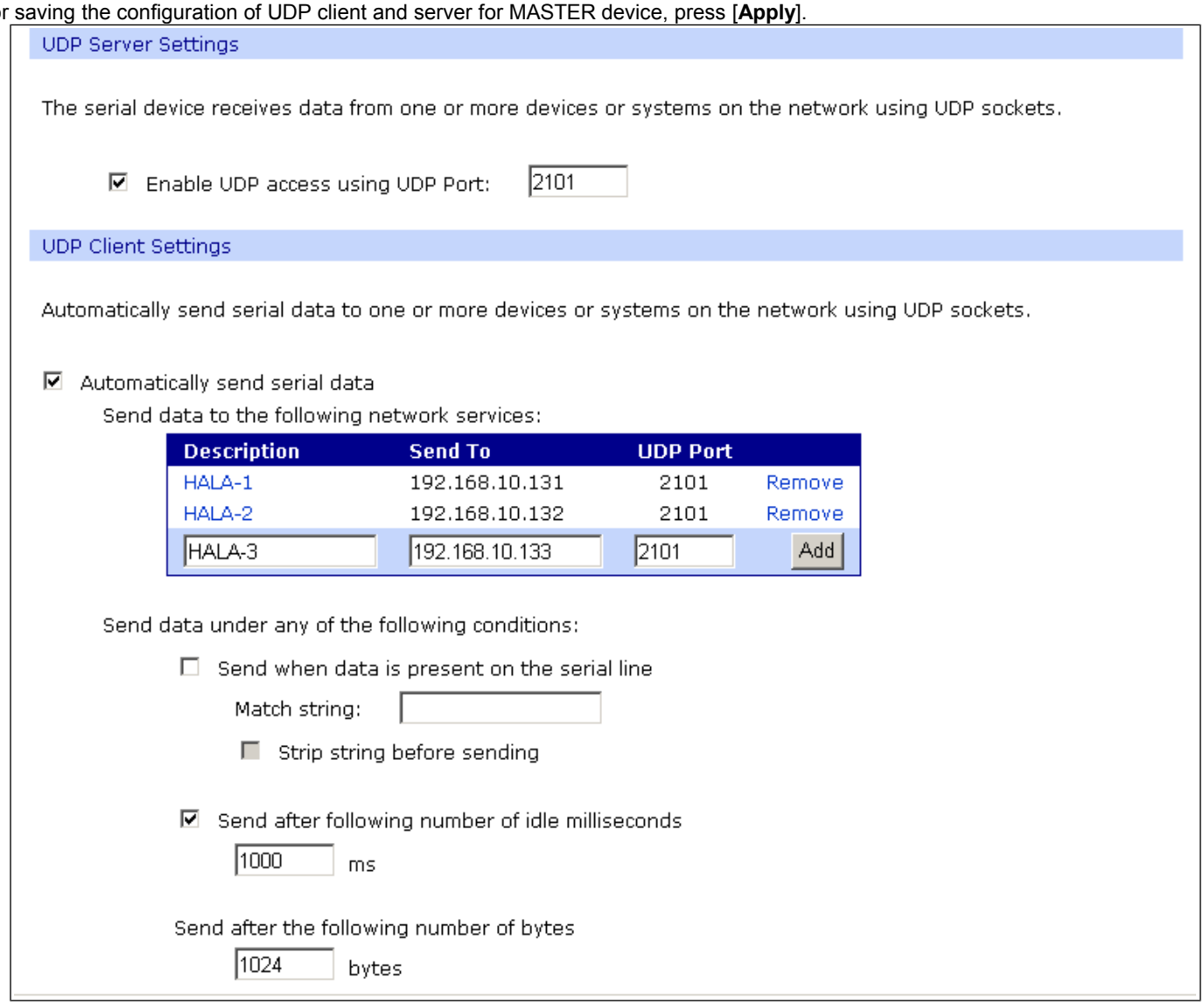


**Fig 18. Example configuration of UDP client and server for converter connected to MASTER device**

#### 5.3.2.1.3.2. UDP CLIENT & SERVER CONFIGURATION IN CASE OF SLAVE DEVICE

Set operating parameters of UDP server for SLAVE device connected via serial port to ADA-13040, eg like on picture below. Set an access to UDP server on e.g. 2101 port. Then select **Automatically send serial data** in section **UDP Client Settings**, this automatically send received data by the use UDP client service to the MASTER device connected to LAN / WAN through e.g. ADA-

13020, ADA-13028L, ADA-13040MG, ADA-13110, ADA14040, ADA-14040.
On lists Send data to the following network services are addresses of network devices and ports to which will be send data. In field:
–**Description** - enter e.g. location of the converter and MASTER device,
–**Send To** - enter IP address of e.g. converter, connected to MASTER device,
–**UDP Port**- enter the number of port on which is working UDP Server of converter connected to MASTER device and press [**Add**]
In the section **Send data under any of the following conditions** is recommended to set parameters like on picture bellow.
For saving the configuration of UDP client and server for SLAVE device, press [**Apply**].

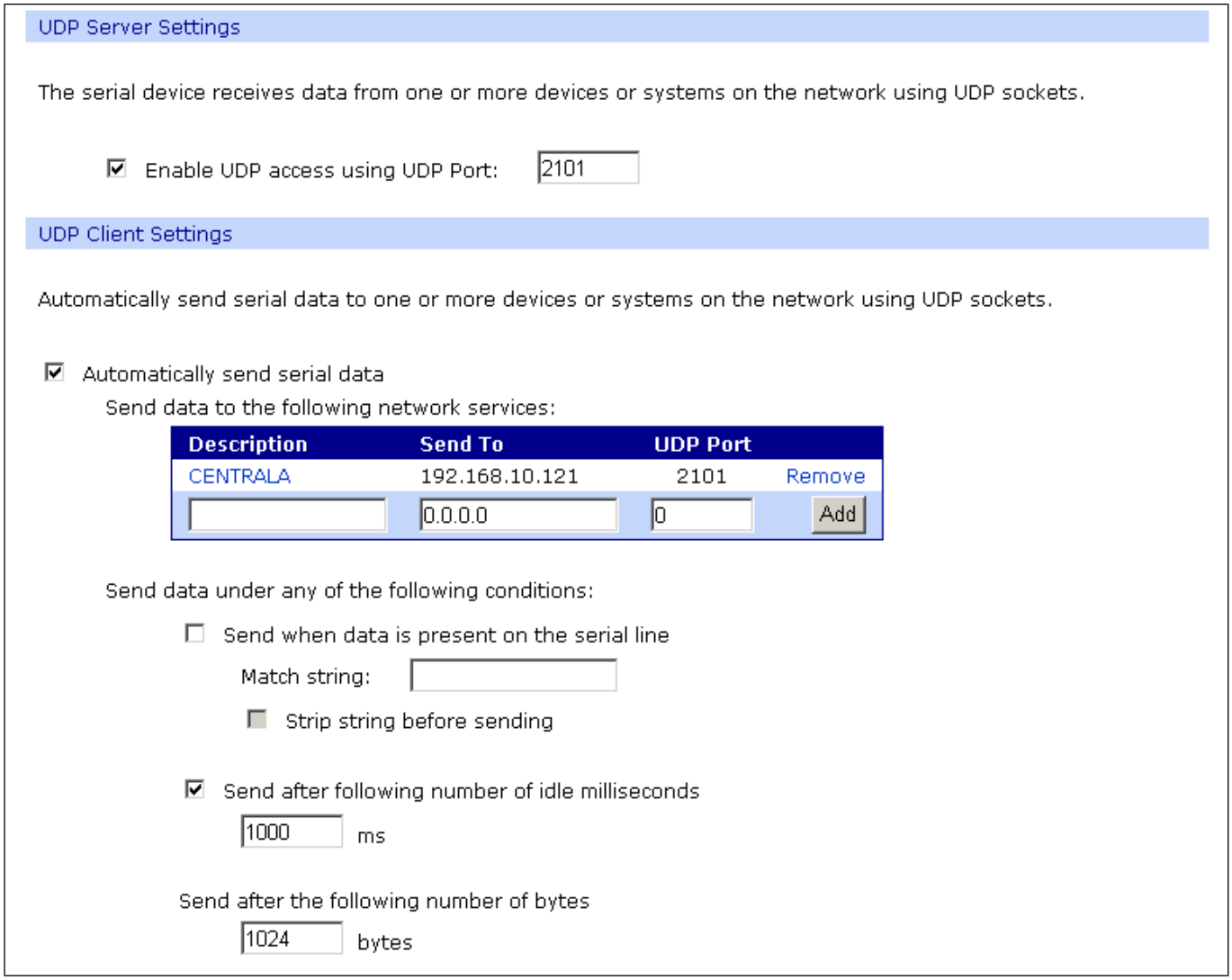
UDP Server Settings
The serial device receives data from one or more devices or systems on the network using UDP sockets.
Enable UDP access using UDP Port:
2101
UDP Client Settings
Automatically send serial data to one or more devices or systems on the network using UDP sockets.
Automatically send serial data
Send data to the following network services:
Description
Send To
UDP Port
CENTRALA
192.168.10.121
2101
Remove
0.0.0.0
0
Add
Send data under any of the following conditions:
Send when data is present on the serial line
Match string:
Strip string before sending
Send after following number of idle milliseconds
1000
ms
Send after the following number of bytes
1024
bytes

**Fig 19. Example configuration of UDP client and server for converter connected to SLAVE device.**

**ATTENTION !**
**2101 is default port of serial port service .**
**If conflict will come in the local network with the other network service using the same port in the configuration of the converter You have to change the number of the port to other for the server of the serial bridge service and the client.**

#### 5.3.2.1.3.3. SERIAL PORT TRANSMISSION PARAMETERS

ADA-13040 will properly operate with devices connected to one serial port RS485/RS422 if the transmission parameters will be set. Select **Basic Serial Settings** and enter Baud Rate, Data Bits, Parity, Stop Bits – the same like in device connected to serial port of converter.

### 5.3.2.1.4. SERIAL BRIDGE PROFILE

If you select Serial Bridge, two devices connected to ADA-13040 converters will able to send data via computer network. If converters are properly configured the communication will be start automatically. For saving UDP server and client configuration press button [**Apply**].
For configuration serial bridge (Fig.20) in section **Serial Bridge Settings** select option **Initiate serial bridge to the following device** and enter IP address and port 2101 of converter with which will be create serial bridge via the network. Additionally you can select **Enable TCP Keep-Alive** what it means the connection will be keep even if data won't be sending via the network. Select option **Allow other devices to initiate serial bridge** then enter port 2101 on which other converter will automatically connected, and also you can select **Enable TCP Keep-Alive**.

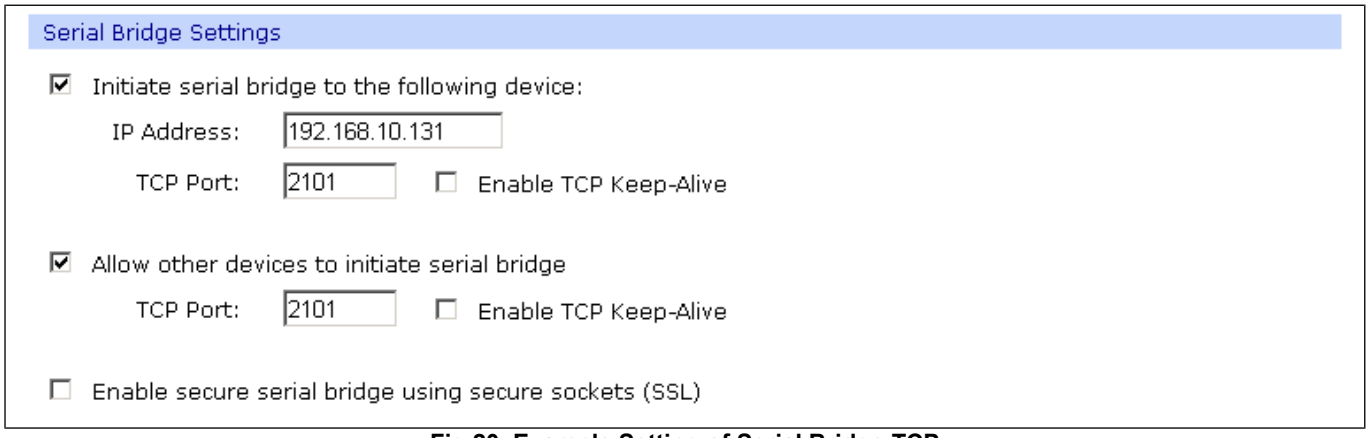
Serial Bridge Settings
Initiate serial bridge to the following device:
IP Address: 192.168.10.131
TCP Port: 2101
Enable TCP Keep-Alive
Allow other devices to initiate serial bridge
TCP Port: 2101
Enable TCP Keep-Alive
Enable secure serial bridge using secure sockets (SSL)

**Fig 20. Example Setting of Serial Bridge TCP**

**ATTENTION !**
**2101 is default port of serial port service .**
**If conflict will come in the local network with the other network service using the same port in the configuration of the converter You have to change the number of the port to other for the server of the serial bridge service and the client.**

#### 5.3.2.1.4.1. SERIAL PORT TRANSMISSION PARAMETERS

ADA- 13040 will properly operate with devices connected to one serial port RS485/RS422 if the transmission parameters will be set. Select **Basic Serial Settings** and enter Baud Rate, Data Bits, Parity, Stop Bits – the same like in device connected to serial port of converter.

### 5.3.3. SYSTEM SETTING

Configuration page **System** has two section:

1. **Device Identity Settings** – You can enter converter name, describe localization and identification number
2. **Simple Network Management Protocol Settings** – You can configure management protocol SNMP

### 5.3.4. USERS AND PERMISSIONS

Configuration page **Users** has two section :

1. **Users -** the way of LOGIN to ADA-13040, selection of **Enable user logins** means that after entering the address http://<converter-ip-address>/admin/administration.htm in browser will shown the login window and you have to enter user name and password.
2. **Configure Users -** this option is used to set additional user, changing user password, access configuration to converter and configuration of each user permissions.

#### 5.3.4.1. USER NAME AND PASSWORD

For changing the user name and password follow the steps:
1. In menu **Configuration** select **Users**.
2. Then select the **root** user.
3. Change name and password.
4. For saving press button [**Apply**].

#### 5.3.4.2. ADDING NEW USER WITH LIMITED PERMISSIONS FOR CONFIGURATION AND MANAGEMENT

If you need to add new user with limited permissions to configuration or management follow the steps :
1. In menu **Configuration** select **Users**.
2. Then in section **Configure Users** press [**New...**].
3. On page Add New User enter:
   **User Name** – the name of new user e.g. **admin**,
   **New Password** – the password for new user,
   **Confirm Password** – confirmation of new password.
4. Confirm entered data by pressing [**Apply**].

On page **Users Configuration** in section **Configure Users** you will see the name of new user.
Now you can configure access permissions to converter and configuration.

Configuration of access to converter:
1. from menu **Configuration** select **Users**.
2. then in section **Configure Users** choose added user e.g. **admin**.
3. on page **User Configuration** – you can:

A/ **User Configuration** – change name and password of user by enter :
**User Name** – the name of new user,
**New Password** – the password for new user,
**Confirm Password** – confirmation of new password.

B/ **User Access –** specify access to converter via network of user by enter:
**Allow command line access** – access with use command line interface **telnet** services,
**Allow web interface access** – access with use Internet browser.

C/ **User Permissions** – specify permissions for services and configuration settings of ADA-13040 converter by selection proper options:
**None** - non permissions,
**Read** – permissions for reading ,
**Read Self** – permissions for reading the self setting, not other users,
**Read/Write** - permissions for reading and writing,
**Read/Write Self** - permissions for reading and writing the self setting, not other users,
**Read All/Write Self** - permissions for reading setting of all users and writing self, not other users
**Execute** - full permission to execute this setting.

4. For saving all entered changes press button [**Apply**].

### 5.3.5. MANAGEMENT

In menu **Management** are two options:
- **Serial Ports**
- **Connections**

#### 5.3.5.1. SERIAL PORT MANAGEMENT

**Serial Ports –** identification of connection via network to serial port of ADA-13040 and disconnection.

#### 5.3.5.2. CONNECTIONS MANAGEMENT

**Connections -** identification of connection via network to serial port of ADA- 13040 and disconnection.

### 5.3.6. ADMINISTRATION

Menu **Administration** allow:
- delete/loading files with java applet,
- backup/restore converter configuration,
- update firmware of converter,
- restoring the factory default settings,
- system information
- converter reboot.

#### 5.3.6.1. FILE MANAGEMENT

**File Management** – uploading and deleting web pages and Java applets, creating by the user.
Uploading file index.htm or index.html allow for autorun the user page in Internet browser after enter http://converter-ip-address and login to ADA-13040 .

#### 5.3.6.2. BACKUP/RESTORE

**Backup/Restore** - backup to a file and restore form file user converter configuration.

#### 5.3.6.3. FIRMWARE UPDATE

**Update Firmware** - firmware updates form the life on disk.
First must update the POST before updating the firmware. Installation details on http://www.cel-mar.pl

#### 5.3.6.4. FACTORY DEFAULT SETTINGS

If you change converter configuration you will be able to return to factory configuration by selecting **Factory Default Settings**. After this converter will be rebooted automatically to activate the restored settings.

#### 5.3.6.5. SYSTEM INFORMATION

Selecting **System Information** you will get information as:
- **General** – device model, MAC address, firmware version, Boot version, POST version itd.
- **GPIO** – not applicable to ADA-13040,
- **Serial** – port description, parent configuration of serial port, condition of controlling lines and data transmission statistic via serial port.
- **Network** - more detailed ETHERNET network statistics for IP, TCP, UDP, ICM protocols.

#### 5.3.6.6. REBOOT

**Reboot** – converter rebooting. The reboot process will take approximately 1 minute to complete.

#### 5.3.6.7. LOGUOT – ENDING CONFIGURATION AND MANAGEMENT

After finishing the configuration or administration work you should press Logout. You will be logged out form WWW server of the Converter.

# 6. USING OF VIRTUAL PORT SERVICE [REALPORT]

## 6.1. INSTALATION OF VIRTUAL PORT DRIVER [REALPORT] IN WINDOWS XP

For installation of virtual port driver from CD-Rom you should select the catalog:
– Drivers/Win98SEME, for Windows 98, Windows 98SE, Windows ME,
– Drivers/Win2000, for Windows2000,
– Drivers/WinXP2003Vista_x86_x64, for Windows XP, Windows Server 2003, Windows Vista.
The Installation is following:
1. connect ADA- 13040 to the ETHERNET network (see p. 3.2.1 - 3.2.2) and power supply.
2. press [**Start**] button, select [**Run**]
3. in the dialog window [**Run**] press [ **Browse** ]
4. select „**My computer**" and CD-Rom with „**ADANET_DRV**".
5. select catalog **Drivers/WinXP2003Vista_x86_x64**.
6. select file „**Setup32.exe**" for 32-bits system or „**Setup64.exe**" for 64-bits and press [**Open**].
7. when the installation window will appear press [**Next**] .
8. the searching will start for converters in the network, found devices will be added to the list.
9. select the converter from the list for installation of virtual port driver and press [**Next**].
10. in window Describe the device select or not the Starting Com port and press [**Finish**]. The driver will be installed.

**You can also install virtual port driver without connection ADA- 13040 to ETHERNET network and the installation is following:**
1. press [**Start**] button, select [**Run**]
2. in the dialog window [**Run**] press [ **Browse** ]
3. select „**My computer**" and CD-Rom with „**ADANET_DRV**".
4. select catalog **Drivers/WinXP2003Vista_x86_x64**.
5. select file „**Setup32.exe**" for 32-bits system or „**Setup64.exe**" for 64-bits and press [**Open**].
6. when the installation window will appear press [**Next**] .
7. the searching for converters in the network will start.
8. if no devices were not found press [**Next**].
9. in the window Describe the device you should set:
   – IP address for converter,
   – number of installing COM port (No. Ports)
   – Starting COM

and press [**Finish**]. The driver will be installed.

**In this way installed virtual port can require the configuration in case of connecting the converter to network.**

## 6.2. CONFIGURATION IN WINDOWS XP SYSTEM

You can make configuration of RealPort driver using the Device Manager of Windows as follow:
1. Press button [ **Start** ], select [ **Properties/Setting** ], press [ **Control Panel** ].
2. Double click icon [ **Administrative Tools**] and [ **Device Manager** ].
3. Press [**Ports (COM & LPT)**]. On Fig. 21 you can see available serial ports COM1, COM2 and **COM3** marked as **ADA- 13040** which was create after installation of RealPort driver.
4. Then you should select [**Multi-port Serial Adapter**], you will see the name **ADA-13040**.
5. Double click converter name, the window [**Properties**] will appear.
6. Select [**Advanced**] and press [**Properties**].
7. **New name of virtual port for converter**. In the window [ **Advanced Properties**] click [**ADA-13040**] and then select [**Properties**], press button [**Rename Ports**], now you can change the name of driver virtual port for example COM5, COM11 etc. To accept the changes press [**OK**].
8. **Selections of IP address, MAC, DNS converter for communication with virtual port driver**. In the window [ **Advanced Properties**] click [**ADA-13040**] and then select [**Network**] (Fig. 22), where you can set the **IP address**, **MAC Address** or **DNS name of converter**.
9. In the next window press [**OK**] to accept the changes.

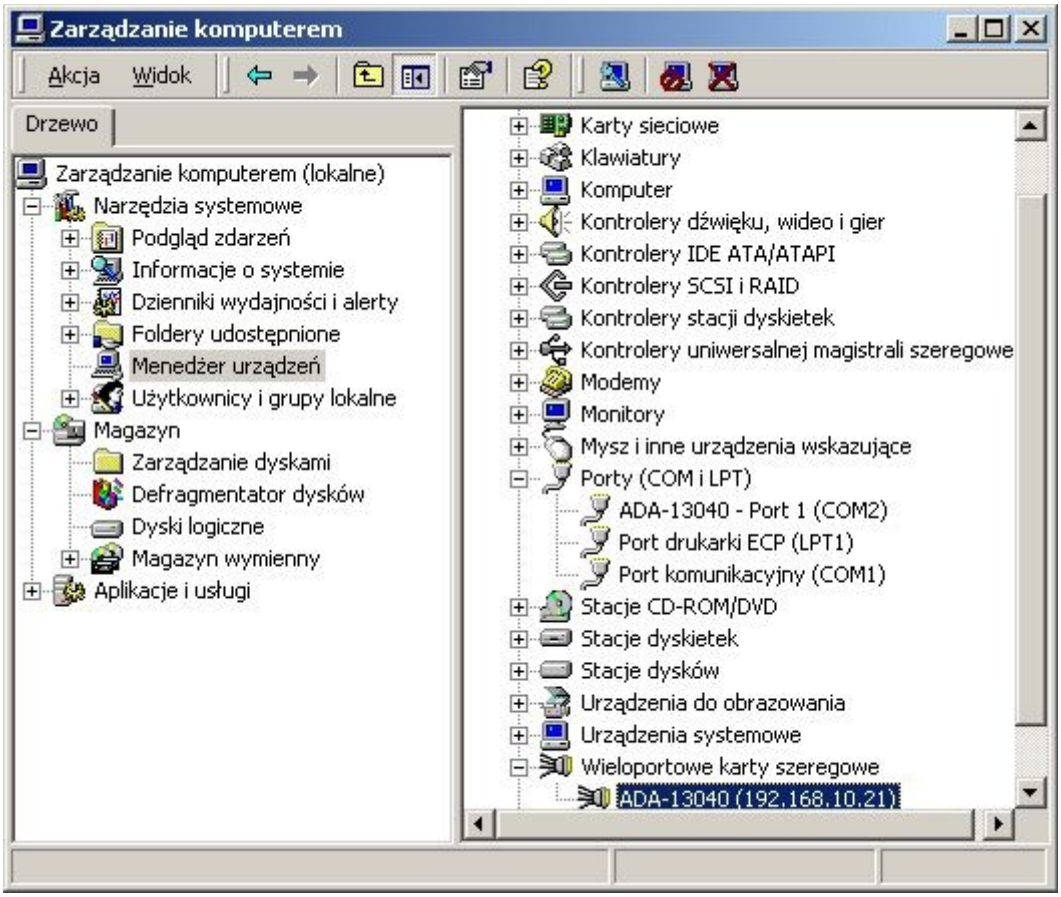


**Fig 21. Devices view on Windows XP system**

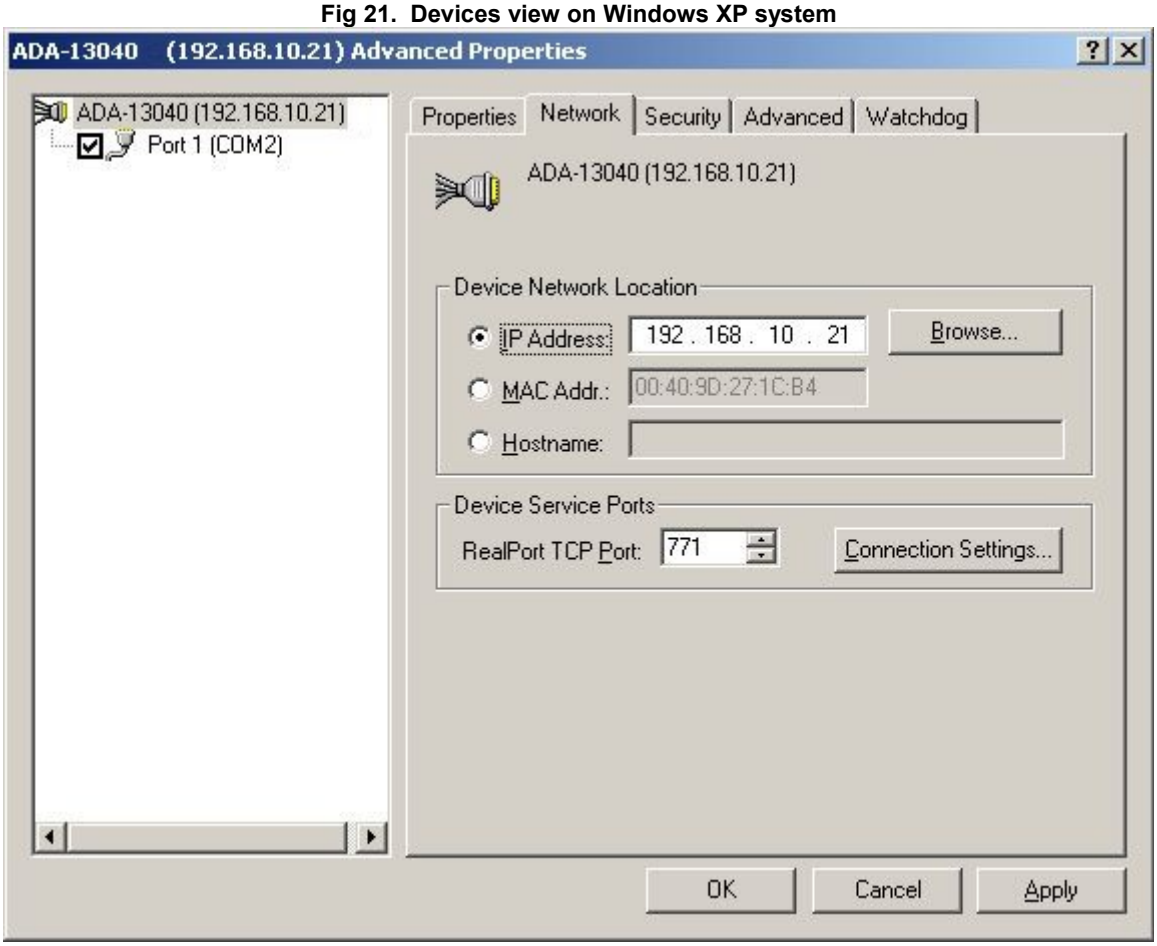


**Fig 22. Configuration of multi-port series adapter**

## 7. DEFAULT SETTING

| *Parameter* | *Value* |
|---|---|
| User name | root |
| Password | dbps |
| IP address | Obtain an IP address automatically using DHCP |
| Port profile | RealPort |
| Bout rate[bits/sec] | 9600 |
| Number of data bits | 8 |
| Parity Control | no |
| Number of stop bits | 1 |
| Flow Control | no |

## 8. PROBLEMS

| *Problem* | *Solution* |
|---|---|
| I forgot the password. | If you forgot the password it is possible to restore to default Setting. In this purpose you should:<br>1. Disconnect converter power supply.<br>2. Remove the cover of converter ETHERNET connector.<br>3. Press and keeping pushed RESET button and powering the converter.<br>4. Release the RESET button after about 20 seconds. |
| I changed the configuration and converter isn't operating. | In this purpose You should:<br>1. Enter in the field of browser http://converter-address-IP .<br>2. Select menu „Restore Default Setting”.<br>3. Press button [Restore Now]. |

## 9. VERSIONS

**ADA-13040 - [ ] - [ ] - [ ]**

| | | | |
|---|---|---|---|
| **Electronic versions:** | | | |
| Basic | **1** | | |
| **Galvanic isolation:** | | | |
| 1kV DC (2-WAY) | | **2** | |
| 3kV DC (2-WAY) | | **3** | |
| 1kV DC (3-WAY) | | **23** | |
| 3kV DC (3-WAY) | | **33** | |
| **Terminal & Terminal Cover:** | | | |
| Cover without inlets, screw terminal block | | | **1** |
| Cover without inlets, screw terminal block | | | **2** |
| Cover without inlets, plug-in screw terminal block | | | **3** |

Order example:
Product Symbol: **ADA-13040-1-23-3**

**1** – basic version of electronic,

**23** – 3-way galvanic isolation 1kV=,

**3** - cover without inlets, plug-in screw terminal block,

## 10. SPECIFICATION

| Parameters | | |
|---|---|---|
| | **ETHERNET** | **RS485/RS422** |
| **Connector** | RJ45 | Screw terminal block - max. Ø 2,5mm$^2$ |
| **Max. Line length** | LAN up to 150 m | 1200 m |
| **Max. number of connected device** | Depend on addressing type in network | 32 |
| **Max. baud rate** | 10/100 Mbit/s | do 230,4 kbps |
| **Transmission line** | 4-pair twisted cable, UTP 4x2x0,5 (24AWG), shield inside large interferences STP 4x2x0,5 (24AWG)). | 2-pair twisted cable, UTP Nx2x0,5 (24AWG), shield inside large interferences STP Nx2x0,5(24AWG). |
| **Standards** | IEEE 802.3, | EIA-485, CCITT V.11 |
| **Transmission line** | Asynchronism half duplex or full duplex, | |
| **Optical Signalization** | • PWD – green LED power supply,<br>• RX - red LED data receiving on RS485/RS422,<br>• TX - yellow LED data transmission via RS485/RS422. | |
| **Nominal Operating Conditions** | | |
| **Power requirements** | 10 - 24 – 30 V DC | |
| **Power Cable** | Recommended length of power cable – up to 3m | |
| **Power** | 3W | |
| **Protection from reverse power polarization** | YES | |
| **Galvanic Isolation** | 1kV or 3kV / 2-WAY or 3-WAY | |
| **Operating temperature** | 0 ÷ +23 ÷ +50°C | |
| **Humidity** | 5 ÷ 95% - non-condensing | |
| **Location during work** | Free | |
| **Mounting** | Rail mounting according to DIN35 standard / TS35. | |
| **Electromagnetic compatibility** | Resistance to disruptions according to the standard PN-EN 55024.<br>Emission of disruptions according to the standard PN-EN 55022. | |
| **Safety requiring** | According to the PN-EN60950 norm. | |
| **Environment** | Commercial and light industrial. | |
| **Casing** | | |
| **Dimensions** | 53 x 90 x 58mm, | |
| **Material** | Noryl UL. 94 V-O | |
| **Degree of casing protection** | IP40 | |
| **Degree of terminal protection** | IP20 | |
| **Weight** | 0,10 kg | |
| **According to standards** | DIN EN50022, DIN EN43880 | |
| **Storing and Transportation** | | |
| **Storage temperature** | -40 ÷ +70°C | |
| **Humidity** | 5 ÷ 95% - non-condensing | |

**Dear Customer,**

Thank you for purchasing **CEL-MAR Company** product.

We hope that this user manual helped connect and start up the **ADA-13040 Converter with.** We also wish to inform you that we are a manufacturer of the widest selections of data communications products in the world such as: data transmission converters with interface RS232, RS485, RS422, USB, Ethernet, Wi-Fi, Current Loop, Fibre-Optic Converters and the other.

Please contact us to tell how you like our products and how we can satisfy you present and future expectation.

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